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SEQUENCE LISTING

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<120> Progenitor Cell Preservation Factors and Methods for
and Products of Their Use

<130> 108236.119

<140> US 09/476,485
<141> 1999-12-30

<150> US 08/881,189
<151> 1997-06-24

<160> 57

<170> PatentIn version 3.0

<210> 1
<211> 939
<212> DNA
<213> Artificial Sequence

<220>
<223> D1-FRIL.

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B 1

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caaggtcatg ccacttctac aaacaatgtc ttacaagtca ccaagttaga cagtgcagga 120

aaccctgtga gttctagtgc ggggaagagtg ttatatcttg caccattgag cctttgggaa 180

gactctgcgg tattgacaag ctttgacacc attatcaact ttgaaatctc aacaccttac 240

acttctcgta tagctgatgg cttggccttc ttcattgcac cacctgactc tgcatcagt 300

tatcatgggtg gttttcttgg actctttccc aacgcaaaca ctctcaaca ctcttccacc 360

tctgaaaacc aaaccaccac taagggtgca tcaagcaacg ttgttgctgt tgaatttgac 420

acctatctta atcccgatta tgggtgatcca aactacatac acatcggaat tgacgtcaac 480

tctattagat ccaaggtaac tgctaagtgg gactggcaaa atgggaaaat agccactgca 540

cacattagct ataactctgt ctctaaaaga ctatctgtta ctagttatta tgctgggagt 600

aaacctgcga ctctctccta tgatattgag ttacatacag tgcttctga atgggtcaga 660

gtaggggttat ctgcttcaac tggacaagat aaagaaagaa ataccgttca ctcatggtct 720

ttcacttcaa gcttgtggac caatgtggcg aagaaggaga atgaaaacaa gtatattaca 780

agaggcggttc tgtgatgata tatgtgtatc aatgattttc tatgttataa gcatgtaatg 840
 tgcgatgagt caataatcac aagtacagtg tagtacttgt atgttggttg tgtaagagtc 900
 agtttgcttt taataataac aagtgcagtt agtacttgt 939

<210> 2
 <211> 264
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> D1-FRIL.

<400> 2

Ala Gly Ser Leu Ser Phe Ser Phe Thr Lys Phe Asp Pro Asn Gln Glu
 1 5 10 15
 Asp Leu Ile Phe Gln Gly His Ala Thr Ser Thr Asn Asn Val Leu Gln
 20 25 30
 Val Thr Lys Leu Asp Ser Ala Gly Asn Pro Val Ser Ser Ser Ala Gly
 35 40 45
 Arg Val Leu Tyr Ser Ala Pro Leu Arg Leu Trp Glu Asp Ser Ala Val
 50 55 60
 Leu Thr Ser Phe Asp Thr Ile Ile Asn Phe Glu Ile Ser Thr Pro Tyr
 65 70 75 80
 Thr Ser Arg Ile Ala Asp Gly Leu Ala Phe Phe Ile Ala Pro Pro Asp
 85 90 95
 Ser Val Ile Ser Tyr His Gly Gly Phe Leu Gly Leu Phe Pro Asn Ala
 100 105 110
 Asn Thr Leu Asn Asn Ser Ser Thr Ser Glu Asn Gln Thr Thr Thr Lys
 115 120 125
 Ala Ala Ser Ser Asn Val Val Ala Val Glu Phe Asp Thr Tyr Leu Asn
 130 135 140
 Pro Asp Tyr Gly Asp Pro Asn Tyr Ile His Ile Gly Ile Asp Val Asn
 145 150 155 160
 Ser Ile Arg Ser Lys Val Thr Ala Lys Trp Asp Trp Gln Asn Gly Lys
 165 170 175
 Ile Ala Thr Ala His Ile Ser Tyr Asn Ser Val Ser Lys Arg Leu Ser
 180 185 190
 Val Thr Ser Tyr Tyr Ala Gly Ser Lys Pro Ala Thr Leu Ser Tyr Asp
 195 200 205

Ile Glu Leu His Thr Val Leu Pro Glu Trp Val Arg Val Gly Leu Ser
 210 215 220
 Ala Ser Thr Gly Gln Asp Lys Glu Arg Asn Thr Val His Ser Trp Ser
 225 230 235 240
 Phe Thr Ser Ser Leu Trp Thr Asn Val Ala Lys Lys Glu Asn Glu Asn
 245 250 255
 Lys Tyr Ile Thr Arg Gly Val Leu
 260

<210> 3
 <211> 1005
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Nucleic acid sequence of the naturally-occurring D1-FRIL protein.

<400> 3
 atggcttcct ccaacttact caccctagcc ctcttccttg tgcttctcac ccacgcaaac 60
 tcagccgcac agtcattgtc atttagtttc accaagtttg atcctaacca agaggatctt 120
 atcttccaag gtcattgccac ttctacaaac aatgtcttac aagtcaccaa gttagacagt 180
 gcaggaaacc ctgtgagttc tagtgcgga agagtgttat attctgcacc attgcgctt 240
 tgggaagact ctgcggtatt gacaagcttt gacaccatta tcaactttga aatctcaaca 300
 cttacactt ctggtatagc tgatggcttg gccttcttca ttgcaccacc tgactctgtc 360
 atcagttatc atgggtggtt tcttggtctc tttcccaacg caaacactct caacaactct 420
 tccacctctg aaaaccaaac caccactaag gctgcatcaa gcaacgttgt tgctgttgaa 480
 tttgacacct atcttaatcc cgattatggt gatccaaact acatacacat cggaattgac 540
 gtcaactcta ttagatccaa ggtaactgct aagtgggact ggcaaaatgg gaaaatagcc 600
 actgcacaca ttagctataa ctctgtctct aaaagactat ctgttactag ttattatgct 660
 gggagtaaac ctgcgactct ctctatgat attgagttac atacagtgtc tcctgaatgg 720
 gtcagagtag ggttatctgc ttcaactgga caagataaag aaagaaatac cgttcactca 780
 tggctcttca cttcaagctt gtggaccaat gtggcgaaga aggagaatga aaacaagtat 840
 attacaagag gcgttctgtg atgatatatg tgtatcaatg attttctatg ttataagcat 900
 gtaatgtgcg atgagtcaat aatcacaagt acagtgtagt acttgatatg tgtttgtgta 960
 agagtcagtt tgcttttaaat aataacaagt gcagtttagta cttgt 1005

<210> 4
 <211> 22
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Signal sequence from the FRIL family isolated from
 Dolichos lab lab

<400> 4

Met Ala Ser Ser Asn Leu Leu Thr Leu Ala Leu Phe Leu Val Leu Leu
 1 5 10 15

Thr His Ala Asn Ser Ala
 20

<210> 5
 <211> 914
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Pv-FRIL.

<400> 5
 gctcagtcac tatcttttaa ctttaccaag tttgatcttg accaaaaaga tcttatcttc 60
 caagggtgatg ccacttctac aaacaatgtc ttacaactca ctaagttaga cagtggagga 120
 aaccctgtgg gtgctagtgt gggaagagtg ttattctctg caccatttca tctttgggaa 180
 aactctatgg cagtgtcaag ctttgaaact aatctcacca ttcaaacttc aacacctcac 240
 ccttattatg cagctgatgg ctttgccctc ttccttgacac cacatgacac tgtcatccct 300
 ccaaattctt ggggcaaatt ccttggaact tactcaaacg ttttcagaaa ctccccacc 360
 tctgaaaacc aaagctttgg tgatgtcaat actgactcaa gagttgttg tgtcgaattt 420
 gacaccttcc ctaatgccaa tattgatcca aattacagac acattggaat cgatgtgaac 480
 tctattaagt ccaaggaaac tgctaggtgg gagtggcaaa atgggaaaac ggccactgca 540
 cgcatcagct ataactctgc ctctaaaaaa tcaactgtta ctacgtttta tcctgggatg 600
 gaagttgtgg ctctctccca tgatgttgac ttacatgcag agcttcctga atgggttaga 660
 gtaggggttat ctgcttcaac tggagaggag aaacaaaaaa ataccattat ctcattggtct 720
 ttcacttcaa gcttgaagaa caacgaggtg aaggagccga aagaagacat gtatattgca 780
 aacgttgtgc gatcatatac atggatcaat gacgttctat cttatataag caataaataa 840
 atgtatgatg cactcaataa taatcacaag tacgtacggt gtagtacttg tatgttgttt 900

atgaaaaaaaaaaaa

914

<210> 6
 <211> 303
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Pv-FRIL.

<400> 6

Ala Gln Ser Leu Ser Phe Asn Phe Thr Lys Phe Asp Leu Asp Gln Lys
 1 5 10 15
 Asp Leu Ile Phe Gln Gly Asp Ala Thr Ser Thr Asn Asn Val Leu Gln
 20 25 30
 Leu Thr Lys Leu Asp Ser Gly Gly Asn Pro Val Gly Ala Ser Val Gly
 35 40 45
 Arg Val Leu Phe Ser Ala Pro Phe His Leu Trp Glu Asn Ser Met Ala
 50 55 60
 Val Ser Ser Phe Glu Thr Asn Leu Thr Ile Gln Ile Ser Thr Pro His
 65 70 75 80
 Pro Tyr Tyr Ala Ala Asp Gly Phe Ala Phe Phe Leu Ala Pro His Asp
 85 90 95
 Thr Val Ile Pro Pro Asn Ser Trp Gly Lys Phe Leu Gly Leu Tyr Ser
 100 105 110
 Asn Val Phe Arg Asn Ser Pro Thr Ser Glu Asn Gln Ser Phe Gly Asp
 115 120 125
 Val Asn Thr Asp Ser Arg Val Val Ala Val Glu Phe Asp Thr Phe Pro
 130 135 140
 Asn Ala Asn Ile Asp Pro Asn Tyr Arg His Ile Gly Ile Asp Val Asn
 145 150 155 160
 Ser Ile Lys Ser Lys Glu Thr Ala Arg Trp Glu Trp Gln Asn Gly Lys
 165 170 175
 Thr Ala Thr Ala Arg Ile Ser Tyr Asn Ser Ala Ser Lys Lys Ser Thr
 180 185 190
 Val Thr Thr Phe Tyr Pro Gly Met Glu Val Val Ala Leu Ser His Asp
 195 200 205
 Val Asp Leu His Ala Glu Leu Pro Glu Trp Val Arg Val Gly Leu Ser
 210 215 220
 Ala Ser Thr Gly Glu Glu Lys Gln Lys Asn Thr Ile Ile Ser Trp Ser

225		230		235		240
Phe Thr Ser Ser Leu Lys Asn Asn Glu Val Lys Glu Pro Lys Glu Asp						
		245		250		255
Met Tyr Ile Ala Asn Val Val Arg Ser Tyr Thr Trp Ile Asn Asp Val						
		260		265		270
Leu Ser Tyr Ile Ser Asn Lys Met Tyr Asp Ala Leu Asn Asn Asn His						
		275		280		285
Lys Tyr Val Arg Cys Ser Thr Cys Met Leu Phe Met Lys Lys Lys						
		290		295		300

<210> 7
 <211> 678
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> YamFril partial mRNA sequence.

<400> 7
 acgaagttcg acagcgacca aaaggatctt atgttccaag gtcataccat ttctagcagc 60
 aatgtcatac aactcaccaa gttagacagt aatggaaacc ctgtgagtac cagtgtggga 120
 agagtgttat actctgcacc attgcgcctt tgggaaagct ctacagtagt gtcaaccttt 180
 gagaccactt tcacctttca aatctcaaca ccttacacta gtcctcctgg tgatgggctc 240
 gccttcttcc ttgcaccata tgacactgtc atccctccaa attctgctgg caatcttctt 300
 ggactctttc ctaacttaaa tgctttaaga aactccacca ccagtaaaga aaccactatt 360
 gatgtcaatg ctgcatctaa caacgttggt gccgttgaat ttgacaccta ccctaacgac 420
 aatattggtg atccaagata caaacacatt ggaatcgatg tcaactctat caggtccaag 480
 gcaactgttg cgtgggactg gcaaaatggg aaaacagcca ctgcacacat cagctataac 540
 totgcctcta aaagactatc tgttactact ttttatcctg ggggtaaagc tgtgagtctt 600
 tcccatgacg ttgagctcac tcaagtgcct cctcaatgga ttagagtagg gttctctgct 660
 tcaacaggat tagagaaa 678

<210> 8
 <211> 234
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> YamFril deduced amino acid sequence.

<400> 8

Ala Gln Ser Val Ser Phe Thr Phe Thr Lys Phe Asp Ser Asp Gln Lys
 1 5 10 15
 Asp Leu Met Phe Gln Gly His Thr Ile Ser Ser Ser Asn Val Ile Gln
 20 25 30
 Leu Thr Lys Leu Asp Ser Asn Gly Asn Pro Val Ser Thr Ser Val Gly
 35 40 45
 Arg Val Leu Tyr Ser Ala Pro Leu Arg Leu Trp Glu Ser Ser Thr Val
 50 55 60
 Val Ser Thr Phe Glu Thr Thr Phe Thr Phe Gln Ile Ser Thr Pro Tyr
 65 70 75 80
 Thr Ser Pro Pro Gly Asp Gly Leu Ala Phe Phe Leu Ala Pro Tyr Asp
 85 90 95
 Thr Val Ile Pro Pro Asn Ser Ala Gly Asn Leu Leu Gly Leu Phe Pro
 100 105 110
 Asn Leu Asn Ala Leu Arg Asn Ser Thr Thr Ser Lys Glu Thr Thr Ile
 115 120 125
 Asp Val Asn Ala Ala Ser Asn Asn Val Val Ala Val Glu Phe Asp Thr
 130 135 140
 Tyr Pro Asn Asp Asn Ile Gly Asp Pro Tyr Arg Lys His Ile Gly Ile
 145 150 155 160
 Asp Val Asn Ser Ile Arg Ser Lys Ala Thr Val Ala Trp Asp Trp Gln
 165 170 175
 Asn Gly Lys Thr Ala Thr Ala His Ile Ser Tyr Asn Ser Ala Ser Lys
 180 185 190
 Arg Leu Ser Val Thr Thr Phe Tyr Pro Gly Gly Lys Ala Val Ser Leu
 195 200 205
 Ser His Asp Val Glu Leu Thr Gln Val Leu Pro Gln Trp Ile Arg Val
 210 215 220
 Gly Phe Ser Ala Ser Thr Gly Leu Glu Lys
 225 230

<210> 9

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Beta band polypeptide.

<400> 9

Ala Gln Ser Val Ser Phe Thr Phe Thr Lys Phe Asp Ser Asp Gln
1 5 10 15

<210> 10

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> Alpha band polypeptide.

<220>

<221> PEPTIDE

<222> (14)..(14)

<223> Amino acid 14 is Xaa wherein Xaa = any amino acid.

<400> 10

Ala Ala Ser Asn Asn Val Val Ala Val Glu Phe Asp Thr Xaa Pro Asn
1 5 10 15

<210> 11

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> MLA degenerate oligonucleotide primer.

<220>

<221> misc_feature

<222> (3)..(21)

<223> Nucleotides 3, 18 and 21 are n wherein n = a or g.

<220>

<221> misc_feature

<222> (6)..(15)

<223> Nucleotides 6, 9, and 15 are n wherein n = t or c.

<220>

<221> misc_feature

<222> (12)..(12)

<223> Nucleotide 12 is n wherein n = a or t.

<400> 11

aantnganc cnaancanga nga

23

<210> 12

<211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> MLZ degenerate oligonucleotide primer.

<220>
 <221> misc_feature
 <222> (3)..(3)
 <223> Nucleotide 3 is n wherein n = a or t.

<220>
 <221> misc_feature
 <222> (6)..(15)
 <223> Nucleotides 6 and 15 are n wherein n = a or g.

<220>
 <221> misc_feature
 <222> (9)..(9)
 <223> Nucleotide 9 is n wherein n = t or c.

<400> 12
 ttnccttnt gccantccca

20

<210> 13
 <211> 15
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer.

<400> 13
 gtaccgagct cggat

15

<210> 14
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer.

<400> 14
 tctagatgca tgctcgag

18

<210> 15
 <211> 22
 <212> DNA

<213> Artificial Sequence

<220>

<223> MLX primer.

<400> 15

gttggacgtc aattccgatg tg

22

<210> 16

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> MLI degenerate primer.

<220>

<221> misc_feature

<222> (3)..(15)

<223> Nucleotides 3, 9, 12 and 15 are n wherein n = t or c.

<220>

<221> misc_feature

<222> (6)..(6)

<223> Nucleotide 6 is n wherein n = a or g.

<400> 16

gcncantcnc tntcntt

17

<210> 17

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo(dT) anchor primer.

<400> 17

gaccacgcgt atcgatgtcg ac

22

<210> 18

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> MLB primer.

<400> 18

aagttagaca gtgcaggaaa c

21

<210> 19
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> MLII primer.

<400> 19
 gcacagtcac tgtcatttag

20

<210> 20
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> D1-FRIL.

<400> 20

Tyr	Leu	Asn	Pro	Asp	Tyr	Gly	Asp	Pro	Asn	Tyr	Ile	His	Ile	Gly	Ile
1				5					10					15	

Asp Val

<210> 21
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Pea.

<400> 21

Phe	Tyr	Asn	Ala	Ala	Trp	Asp	Pro	Ser	Asn	Arg	Asp	Arg	His	Ile	Gly
1				5					10					15	

Ile Asp Val

<210> 22
 <211> 1005
 <212> DNA
 <213> Artificial Sequence

<220>

<223> SpDLA.

<400> 22

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tcagccgcac agtcattgtc atttagtttc accaagtttg atcctaacca agaggatcct      120
atcttccaag gtcatgccac ttctacaaac aatgtcttac aagtcaccaa gttagacagt      180
gcaggaaacc ctgtgagttc tagtgcgga agagtgttat attctgcacc attgcgcctt      240
tggaagact ctgcgttatt gacaagcttt gacaccatta tcaacttga aatctcaaca      300
ccttacactt ctggtatagc tgatggcttg gccttcttca ttgcaccacc tgactctgtc      360
atcagttatc atggtgggtt tcttggaactc tttcccaacg caaacactct caacaactct      420
tccacctctg aaaaccaaac caccactaag gctgcatcaa gcaacgttgt tgctgttgaa      480
tttgacacct atcttaatcc cgattatggt gatccaaact acatacacat cggaattgac      540
gtcaactcta ttagatccaa ggtaactgct aagtgggact ggcaaatgg gaaaatagcc      600
actgcacaca ttagctataa ctctgtctct aaaagactat ctggttactag ttattatgct      660
gggagtaaac ctgcgactct ctctatgat attgagttac atacagtgtc tcctgaatgg      720
gtcagagtag gggtatctgc ttcaactgga caagataaag aaagaaatac cgttcactca      780
tggtctttca cttcaagctt gtggaccaat gtggcgaaga aggagaatga aaacaagtat      840
attacaagag gcgttctgtg atgatatatg tgtatcaatg attttctatg ttataagcat      900
gtaatgtgcg atgagtcaat aatcacaagt acagtgtagt acttgtatgt tgtttgtgta      960
agagtcagtt tgcttttaat aataacaagt gcagttagta cttgt                      1005

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<210> 23

<211> 286

<212> PRT

<213> Artificial Sequence

<220>

<223> SpDLA.

<400> 23

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Met Ala Ser Ser Asn Leu Leu Thr Leu Ala Leu Phe Leu Val Leu Leu
1           5           10           15
Thr His Ala Asn Ser Ala Ala Gln Ser Leu Ser Phe Ser Phe Thr Lys
          20           25           30

```

Phe Asp Pro Asn Gln Glu Asp Leu Ile Phe Gln Gly His Ala Thr Ser
 35 40 45
 Thr Asn Asn Val Leu Gln Val Thr Lys Leu Asp Ser Ala Gly Asn Pro
 50 55 60
 Val Ser Ser Ser Ala Gly Arg Val Leu Tyr Ser Ala Pro Leu Arg Leu
 65 70 75 80
 Trp Glu Asp Ser Ala Val Leu Thr Ser Phe Asp Thr Ile Ile Asn Phe
 85 90 95
 Glu Ile Ser Thr Pro Tyr Thr Ser Arg Ile Ala Asp Gly Leu Ala Phe
 100 105 110
 Phe Ile Ala Pro Pro Asp Ser Val Ile Ser Tyr His Gly Gly Phe Leu
 115 120 125
 Gly Leu Phe Pro Asn Ala Asn Thr Leu Asn Asn Ser Ser Thr Ser Glu
 130 135 140
 Asn Gln Thr Thr Thr Lys Ala Ala Ser Ser Asn Val Val Ala Val Glu
 145 150 155 160
 Phe Asp Thr Tyr Leu Asn Pro Asp Tyr Gly Asp Pro Asn Tyr Ile His
 165 170 175
 Ile Gly Ile Asp Val Asn Ser Ile Arg Ser Lys Val Thr Ala Lys Trp
 180 185 190
 Asp Trp Gln Asn Gly Lys Ile Ala Thr Ala His Ile Ser Tyr Asn Ser
 195 200 205
 Val Ser Lys Arg Leu Ser Val Thr Ser Tyr Tyr Ala Gly Ser Lys Pro
 210 215 220
 Ala Thr Leu Ser Tyr Asp Ile Glu Leu His Thr Val Leu Pro Glu Trp
 225 230 235 240
 Val Arg Val Gly Leu Ser Ala Ser Thr Gly Gln Asp Lys Glu Arg Asn
 245 250 255
 Thr Val His Ser Trp Ser Phe Thr Ser Ser Leu Trp Thr Asn Val Ala
 260 265 270
 Lys Lys Glu Asn Glu Asn Lys Tyr Ile Thr Arg Gly Val Leu
 275 280 285

<210> 24

<211> 8

<212> PRT

<213> Dolichos lablab

<220>

<221> PEPTIDE

<222> (7)..(7)

<223> Amino acid 7 is Xaa wherein Xaa = any amino acid.

<400> 24

Thr Asn Asn Val Leu Gln Xaa Thr
1 5

<210> 25

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> MutI primer.

<400> 25

ccataatcgg gatcaagata ggtg

24

<210> 26

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> MutII primer.

<400> 26

cacctatctt gatcccgatt atgg

24

<210> 27

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> M1 Forw primer.

<400> 27

aactcagccg cacagtcatt gtca

24

<210> 28

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> APEcoRI primer.

<400> 28

gaattcgacc acgcgtatcg atgtcgac

28

<210> 29
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sigforw primer.

<400> 29
 gaattcatgg cttcctccaa c

21

<210> 30
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sigrev primer.

<400> 30
 tgactgtgcg gctgagtttg cgtgggtg

28

<210> 31
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Peptide corresponding to Pv-FRIL.

<220>
 <221> PEPTIDE
 <222> (7)..(7)
 <223> Amino acid 7 is Xaa wherein Xaa = Asn, Cys or Ser.

<400> 31

Ala Gln Ser Leu Ser Phe Xaa Phe Thr Lys Phe Asp Leu Asp
 1 5 10

<210> 32
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Polypeptide of 18 kDa.

<220>

<221> PEPTIDE

<222> (7)..(7)

<223> Amino acid 7 is Xaa wherein Xaa = unknown amino acid.

<400> 32

Ala Gln Ser Leu Ser Phe Xaa Phe Thr Lys Asp Ala Leu Asp
1 5 10

<210> 33

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Aminoterminal sequence.

<220>

<221> PEPTIDE

<222> (12)..(12)

<223> Amino acid 12 is Xaa wherein Xaa = unknown amino acid.

<400> 33

Thr Asp Ser Arg Val Val Ala Val Glu Phe Asp Xaa Phe Pro
1 5 10

<210> 34

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> Aminoterminal polypeptide.

<220>

<221> PEPTIDE

<222> (7)..(7)

<223> Amino acid 7 is Xaa wherein Xaa = unknown amino acid.

<400> 34

Ala Gln Ser Leu Ser Phe Xaa Phe Lys Phe Asp Pro Asn
1 5 10

<210> 35

<211> 11

<212> PRT

<213> Artificial Sequence

<220>

<223> Aminoterminal polypeptide.

<400> 35

Thr Asp Ser Arg Val Val Ala Val Glu Asp Phe
 1 5 10

<210> 36

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Degenerate oligonucleotide PVBeta1.

<220>

<221> misc_feature

<222> (18)..(18)

<223> Nucleotide 18 is n wherein n = any nucleotide.

<400> 36

ttyacyaart tygayytnga

20

<210> 37

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Degenerate oligonucleotide PVBeta2.

<400> 37

atyttycarg gwgaygc

17

<210> 38

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Degenerate oligonucleotide PValfa1.

<400> 38

ttracrtrera twccratrtg

20

<210> 39

<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Degenerate oligonucleotide PVA1fa2.

<400> 39
tarttwgggt cratrttrgc rtt

23

<210> 40
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> PV3 PCR-Anchor primer.

<400> 40
caatgtctta caactcacta ag

22

<210> 41
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> PV4 PCR-Anchor primer.

<400> 41
agtgtgggaa gagtgttatt c

21

<210> 42
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> SPV2 Anchor primer.

<400> 42
accaaagctt tggttttcag a

21

<210> 43
<211> 21
<212> DNA

<213> Artificial Sequence

<220>

<223> SPV3 Anchor primer.

<400> 43

tctgaaaacg tttgagtaga g

21

<210> 44

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> PVEcoRI primer.

<400> 44

tacatgaatt cgctcagtca ttatctttta ac

32

<210> 45

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Sigfor BglII primer.

<400> 45

agatctatgg cttcctccaa c

21

<210> 46

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Sigrev primer.

<400> 46

aaagataatg actgagcggc tgagtttgcg tg

32

<210> 47

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> SpMlforw primer.

<400> 47

cacgcaaaact cagccgctca gtcattatct tt

32

<210> 48

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> APXhoI primer.

<400> 48

ctcgaggacc acgcgtatcg atgtcga

27

<210> 49

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Beta-subunit of the mannose lectin of Gowda et al.

<400> 49

Ala	Gln	Ser	Leu	Ser	Phe	Ser	Ser	Phe	Thr	Lys	Phe	Asp	Pro	Asn	Gln
1				5					10					15	

Glu	Asp	Leu	Ile	Phe	Gln	Gly	Thr	Ala	Thr	Ser	Lys	Leu	Asp	Ser	Ala
		20						25					30		

Gly	Asn	Pro	Val	Ser	Ser	Ser	Ala	Gly	Arg	Val	Leu	Tyr	Ser	Ala	Pro
		35					40					45			

Leu	Arg	Leu	Trp	Glu	Asp	Ser	Ala	Val	Leu	Thr	Ser	Phe	Asp	Pro	Thr
	50					55					60				

Ile	Tyr	Ile	Phe	Thr	Asn	Tyr	Thr	Ser	Arg	Ile	Ala	Asp	Gly	Leu	Ala
65					70					75				80	

Phe	Ile	Ala	Pro	Pro	Asp	Ser	Val	Ile	Ser	Tyr	His	Gly	Gly	Phe	Leu
			85						90					95	

Gly	Leu	Phe	Pro	Asn	Ala	Ala	Glu	Ser	Gly
	100							105	

<210> 50

<211> 123

<212> PRT

<213> Artificial Sequence

<220>

<223> Beta-subunit of D1-FRIL.

<400> 50

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Ala Gln Ser Leu Ser Phe Ser Phe Thr Lys Phe Asp Pro Asn Gln Glu
1           5           10           15
Asp Leu Ile Phe Gln Gly His Ala Thr Ser Thr Asn Asn Val Leu Gln
          20           25           30
Val Thr Lys Leu Asp Ser Ala Gly Asn Pro Val Ser Ser Ser Ala Gly
          35           40           45
Arg Val Leu Tyr Ser Ala Pro Leu Arg Leu Trp Glu Asp Ser Ala Val
          50           55           60
Leu Thr Ser Phe Asp Thr Ile Ile Asn Phe Glu Ile Ser Thr Pro Tyr
65           70           75           80
Thr Ser Arg Ile Ala Asp Gly Leu Ala Phe Phe Ile Ala Pro Pro Asp
          85           90           95
Ser Val Ile Ser Tyr His Gly Gly Phe Leu Gly Leu Phe Pro Asn Ala
          100          105          110
Asn Thr Leu Asn Asn Ser Ser Thr Ser Glu Asn
          115          120

```

<210> 51

<211> 132

<212> PRT

<213> Artificial Sequence

<220>

<223> Alpha-subunit of the mannose lectin of Gowda et al.

<400> 51

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Ile Ala Glu Ser Asn Val Val Ala Val Glu Phe Asp Thr Asp Tyr Leu
1           5           10           15
Asn Pro Asp Tyr Gly Asp Pro Asn Tyr Ile His Ile Gly Ile Asp Val
          20           25           30
Asn Ser Ile Arg Ser Lys Val Thr Ala Ser Trp Asp Trp Gln Asn Gly
          35           40           45
Lys Ile Ala Thr Ala His Ile Ser Tyr Asn Ser Val Ser Lys Arg Leu
          50           55           60
Ser Val Thr Thr Tyr Tyr Pro Gly Arg Gly Lys Pro Ala Thr Ser Tyr
65           70           75           80

```

Asp Ile Glu Leu His Thr Val Leu Pro Glu Trp Val Arg Val Gly Leu
 85 90 95

Ser Ala Ser Thr Gly Gln Asn Ile Glu Arg Asn Thr Val His Ser Trp
 100 105 110

Ser Phe Thr Ser Ser Leu Trp Thr Asn Val Ala Lys Val Gly Val Ala
 115 120 125

Ser Ile Ser Gly
 130

<210> 52

<211> 147

<212> PRT

<213> Artificial Sequence

<220>

<223> Alpha-subunit of D1-FRIL.

<400> 52

Gln Thr Thr Thr Lys Ala Ala Ser Ser Asn Val Val Ala Val Glu Phe
 1 5 10 15

Asp Thr Tyr Leu Asn Pro Asp Tyr Gly Asp Pro Asn Tyr Ile His Ile
 20 25 30

Gly Ile Asp Val Asn Ser Ile Arg Ser Lys Val Thr Ala Lys Trp Asp
 35 40 45

Trp Gln Asn Gly Lys Ile Ala Thr Ala His Ile Ser Tyr Asn Ser Val
 50 55 60

Ser Lys Arg Leu Ser Val Thr Ser Tyr Tyr Ala Gly Ser Lys Pro Ala
 65 70 75 80

Thr Leu Ser Tyr Asp Ile Glu Leu His Thr Val Leu Pro Glu Trp Val
 85 90 95

Arg Val Gly Leu Ser Ala Ser Thr Gly Gln Asp Lys Glu Arg Asn Thr
 100 105 110

Val His Ser Trp Ser Phe Thr Ser Ser Leu Trp Thr Asn Val Ala Lys
 115 120 125

Lys Glu Asn Glu Asn Lys Tyr Ile Thr Arg Gly Val Leu Tyr Met Cys
 130 135 140

Ile Asn Asp
 145

<210> 53

<211> 64

<212> DNA

<213> Artificial Sequence

<220>

<223> Recombinant expression vector.

<400> 53

ctgggtccgc gtggatcccc ggaattcatg cccgggtcga ctcgagcggc cgcacgtga 60
ctga 64

<210> 54

<211> 54

<212> DNA

<213> Artificial Sequence

<220>

<223> Recombinant expression vector.

<400> 54

ctgggtccgc gtggatcccc ggaattcatg ctcgagcggc cgcacgtga ctga 54

<210> 55

<211> 237

<212> PRT

<213> Artificial Sequence

<220>

<223> DLL.

<400> 55

Ala	Gln	Ser	Leu	Ser	Phe	Ser	Phe	Thr	Lys	Phe	Asp	Pro	Asn	Gln	Glu	1	5	10	15
Asp	Leu	Ile	Phe	Gln	Gly	Thr	Ala	Thr	Ser	Lys	Leu	Asp	Ser	Ala	Gly	20	25	30	
Asn	Pro	Val	Ser	Ser	Ser	Ala	Gly	Arg	Val	Leu	Tyr	Ser	Ala	Pro	Leu	35	40	45	
Arg	Leu	Trp	Glu	Asp	Ser	Ala	Val	Leu	Thr	Ser	Phe	Asp	Pro	Thr	Ile	50	55	60	
Tyr	Ile	Phe	Thr	Asn	Tyr	Thr	Ser	Arg	Ile	Ala	Asp	Gly	Leu	Ala	Phe	65	70	75	80
Ile	Ala	Pro	Pro	Asp	Ser	Val	Ile	Ser	Tyr	His	Gly	Gly	Phe	Leu	Gly	85	90	95	
Leu	Phe	Pro	Asn	Ala	Ala	Glu	Ser	Gly	Ile	Ala	Glu	Ser	Asn	Val	Val	100	105	110	

Ala Val Glu Phe Asp Thr Asp Tyr Leu Asn Pro Asp Tyr Gly Asp Pro
 115 120 125
 Asn Tyr Ile His Ile Gly Ile Asp Val Asn Ser Ile Arg Ser Lys Val
 130 135 140
 Thr Ala Ser Trp Asp Trp Gln Asn Gly Lys Ile Ala Thr Ala His Ile
 145 150 155 160
 Ser Tyr Asn Ser Val Ser Lys Arg Leu Ser Val Thr Thr Tyr Tyr Pro
 165 170 175
 Gly Arg Gly Lys Pro Ala Thr Ser Tyr Asp Leu Glu Leu His Thr Val
 180 185 190
 Leu Pro Glu Trp Val Arg Val Gly Leu Ser Ala Ser Thr Gly Gln Asn
 195 200 205
 Ile Glu Arg Asn Thr Val His Ser Trp Ser Phe Thr Ser Ser Leu Trp
 210 215 220
 Thr Asn Val Ala Lys Val Gly Val Ala Ser Ile Ser Gly
 225 230 235

<210> 56
 <211> 279
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PvFRIL.

<400> 56

Ala Gln Ser Leu Ser Phe Asn Phe Thr Lys Phe Asp Leu Asp Gln Lys
 1 5 10 15
 Asp Leu Ile Phe Gln Gly Asp Ala Thr Ser Thr Asn Asn Val Leu Gln
 20 25 30
 Leu Thr Lys Leu Asp Ser Gly Gly Asn Pro Val Gly Ala Ser Val Gly
 35 40 45
 Arg Val Leu Phe Ser Ala Pro Phe His Leu Trp Glu Asn Ser Met Ala
 50 55 60
 Val Ser Ser Phe Glu Thr Asn Leu Thr Ile Gln Ile Ser Thr Pro His
 65 70 75 80
 Pro Tyr Tyr Ala Ala Asp Gly Phe Ala Phe Phe Leu Ala Pro His Asp
 85 90 95
 Thr Val Ile Pro Pro Asn Ser Trp Gly Lys Phe Leu Gly Leu Tyr Ser
 100 105 110
 Asn Val Phe Arg Asn Ser Pro Thr Ser Glu Asn Gln Ser Phe Gly Asp

115 120 125
 Val Asn Thr Asp Ser Arg Val Val Ala Val Glu Phe Asp Thr Phe Pro
 130 135 140
 Asn Ala Asn Ile Asp Pro Asn Tyr Arg His Ile Gly Ile Asp Val Asn
 145 150 155 160
 Ser Ile Lys Ser Lys Glu Thr Ala Arg Trp Glu Trp Gln Asn Gly Lys
 165 170 175
 Thr Ala Thr Ala Arg Ile Ser Tyr Asn Ser Ala Ser Lys Lys Ser Thr
 180 185 190
 Val Thr Thr Phe Tyr Pro Gly Met Glu Val Val Ala Leu Ser His Asp
 195 200 205
 Val Asp Leu His Ala Glu Leu Pro Glu Trp Val Arg Val Gly Leu Ser
 210 215 220
 Ala Ser Thr Gly Glu Glu Lys Gln Lys Asn Thr Ile Ile Ser Trp Ser
 225 230 235 240
 Phe Thr Ser Ser Leu Lys Asn Asn Glu Val Lys Glu Pro Lys Glu Asp
 245 250 255
 Met Tyr Ile Ala Asn Val Val Arg Ser Tyr Thr Trp Ile Asn Asp Val
 260 265 270
 Leu Ser Tyr Ile Ser Asn Lys
 275

<210> 57
 <211> 254
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PHA-E.

<400> 57

Ala Ser Gln Thr Ser Phe Ser Phe Gln Arg Phe Asn Glu Thr Asn Leu
 1 5 10 15
 Ile Leu Gln Arg Asp Ala Thr Val Ser Ser Lys Gly Gln Leu Arg Leu
 20 25 30
 Thr Asn Val Asn Asp Asn Gly Glu Pro Thr Leu Ser Ser Leu Gly Arg
 35 40 45
 Ala Phe Tyr Ser Ala Pro Ile Gln Ile Trp Asp Asn Thr Thr Gly Ala
 50 55 60
 Val Ala Ala Ser Pro Thr Ser Phe Thr Phe Asn Ile Asp Val Pro Asn
 65 70 75 80

Asn Ser Gly Pro Ala Asp Gly Leu Ala Phe Val Leu Leu Pro Val Gly
 85 90 95
 Ser Gln Pro Lys Asp Lys Gly Gly Leu Leu Gly Leu Phe Asn Asn Tyr
 100 105 110
 Lys Tyr Asp Ser Asn Ala His Thr Val Ala Val Glu Phe Asp Thr Leu
 115 120 125
 Tyr Asn Val His Trp Asp Pro Lys Pro Arg His Ile Gly Ile Asp Val
 130 135 140
 Asn Ser Ile Lys Ser Ile Lys Thr Thr Thr Trp Asp Phe Val Lys Gly
 145 150 155 160
 Glu Asn Ala Glu Val Leu Ile Thr Tyr Asp Ser Ser Thr Lys Leu Leu
 165 170 175
 Val Ala Ser Leu Val Tyr Pro Ser Leu Lys Thr Ser Phe Ile Val Ser
 180 185 190
 Asp Thr Val Asp Leu Lys Ser Val Leu Pro Glu Trp Val Ile Val Gly
 195 200 205
 Phe Thr Ala Thr Thr Gly Ile Thr Lys Gly Asn Val Glu Thr Asn Asp
 210 215 220
 Ile Leu Ser Trp Ser Phe Ala Ser Lys Leu Ser Asp Gly Thr Thr Ser
 225 230 235 240
 Glu Ala Leu Asn Leu Ala Asn Phe Ala Leu Asn Gln Ile Leu
 245 250